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EXAMINER	
TIMORY, KABIR A	

ART UNIT	PAPER NUMBER
2611	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/616,143	LAROIA ET AL.	
	Examiner	Art Unit	
	KABIR A. TIMORY	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 27 August 2008.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-29 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-29 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. This office action is in response to the amendment filed on 08/27/2008. Claims 1-29 are pending in this application and have been considered below.

4. The rejection under 35 USC 112 2nd paragraph to claims 2-13 is corrected by the amendment; therefore, the rejection is withdrawn.

5. Applicant's arguments with respect to claims 1-29 have been considered but are moot in view of new ground(s) of rejection.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-13 and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korobkov et al. (US 2003/0123383) in view of Cleveland et al. (US 7,224,742) and further in view of Applicant's Admitted Prior Art (AAPA) (figure 1, specification, pages 2-3).

Regarding claim 1:

As shown in figure 1-8, Korobkov et al., discloses a frequency hopping communication device for transmitting signals on a plurality of M subcarrier signals in parallel, each of said M subcarrier signals corresponding to a different one of M subcarrier signal frequencies, said M subcarrier signal frequencies being a subset of N subcarrier frequencies on which said communications device may transmit signals over time, where M and N are positive integers and where M<N (abstract, par 0017, lines 1-56), said frequency hopping (par 0096, lines 1-7) communication device including:

- a frequency control circuit (55 in figure 3) for controlling which of the N subcarrier frequencies are generated and used by said device for the transmission of signals (paragraph 0040, lines 1-22);
- a plurality of M separate subcarrier signals paths operating in parallel (figures 3 & 6) ***(in paragraph 0020, lines 4-10, Korobkov et al. disclose "By way of explanation, a set of N complex values used to modulate the set of N sub-carriers for one sub-channel can be correctly positioned in the channel spectrum by placing the values in a sequence representing the complete set of sub-carriers for an entire channel and then taking an IFFT". This clearly shows that the modulators of figure 3 generate OFDM sub-carriers. Also, see paragraphs 0006, 0017, 0018, 0020, 0037, 0038, and 0078)***, each of the M subcarrier signal paths including a programmable signal generator (52(1)-52(J) in figure 3) ***(in the abstract , lines 1-5, Korobkov et al. disclose "A transmitter and corresponding method for transmitting an OFDM signal in a communications channel, including a plurality of base-band OFDM modulators, each for modulating a respective data signal onto a plurality of orthogonal sub-carriers".***

Also, see paragraphs 0006, 0017, 0018, 0020, 0037, 0038, and 0078) coupled to said frequency control circuit (55 in figure 3), and a filter circuit (54 in figure 3, par 0040, lines 1-12), said programmable signal generator for generating a subcarrier signal determined by said frequency control circuit and having a subcarrier frequency corresponding to said subcarrier signal path to which said signal generator corresponds (figure 3, par 0040, lines 1-12), and

- a combining circuit (62 in figure 6) for combining corresponding to different subcarrier signal paths prior to transmission (par 0063, lines 1-19).

Korobkov et al. disclose all of the subject matter as described above except for specifically teaching a power amplification circuit.

However, Cleveland et al., in the same field of endeavor, teaches a power amplification circuit (250 in figure 2, col 3, lines 60-67, col 7, lines 1-5).

One of ordinary skill in the art would have clearly recognized that in a multi-carrier communication systems, spread spectrum multiple access typically employed with orthogonal frequency-division multiplexing (OFDM). Spreading codes are commonly used to spread data symbols across multiple OFDM subcarriers for diversity benefits and to shape the resulting superposition of coded subcarriers for reducing the Peak-to-Average Power (PAPR) of the transmitted signal. Often times, power amplifiers are used to amplify the transmitted signal power to a desired power threshold. To adjust the signal power to a desired threshold and output a combined signal for transmission, it would have been obvious to one ordinary skill in the art at the time the invention was made to use power amplifiers as taught by Cleveland et al. in system and

method of Korobkov et al. in order to provide a desired power level for transmission and reduce peak average power ratio in the system.

Korobkov et al. disclose and Cleveland et al. all of the subject matter as described above including a combiner for combining corresponding to different subcarrier signal paths prior to transmission as shows in figure 3 of Korobkov et al. below except for specifically teaching combining analog subcarrier signals.

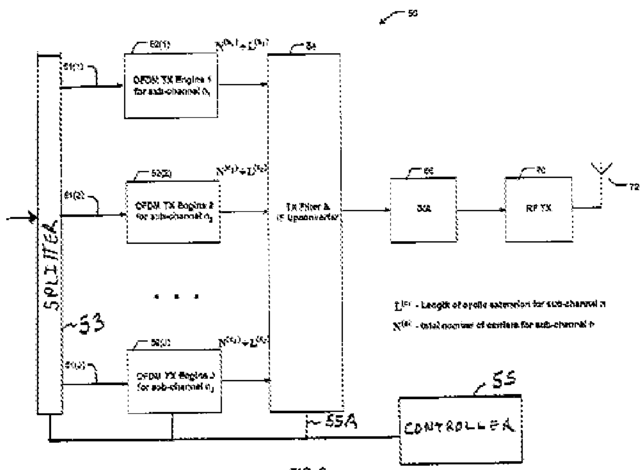
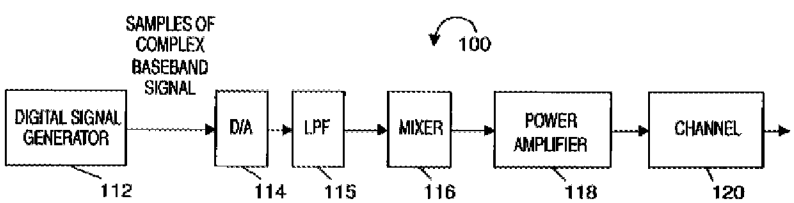


FIG. 3

However, AAPA in the same field of endeavor teaches analog subcarrier signals (114 in figure 1).



PRIOR ART
Fig. 1

In figure 3, Korobkov et al. shows that a D/A converter 68 is located after the TX filter 54. However AAPA shows that the D/A converter 114 can be located before the filter 116. Therefore, it would have been obvious to one of ordinary skilled in the art at

the time the invention was made to modify the system and method of Korobkov et al. by locating the D/A converter 68 of Korobkov et al. before the TX filter 54 as taught by AAPA in figure 1 in order to yield predictable results.

Regarding claim 2:

Korobkov et al. further discloses wherein each of the M signal filter circuits, that each correspond to a different one of said M signal paths, is a fixed filter, at least one of the M fixed filters having a passband bandwidth at least equal to Y times the average frequency spacing between the N frequencies that said device can use as the N subcarrier frequencies, where Y is a positive number greater than 1 (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claims 3 and 26:

Korobkov et al. further discloses wherein Y > = N divided by M (par 0003, lines 1-18, par 0037, lines 1-3, par 0038, lines 1-4).

Regarding claim 4:

Korobkov et al. further discloses wherein Y is at least as large as N (par 0003, lines 1-18, par 0037, lines 1-3, par 0038, lines 1-4).

Regarding claim 5:

Korobkov et al. further discloses wherein each of said M signal filter circuits are identical fixed filters each having a passband bandwidth covering the full set of N subcarrier signal frequencies which may be used by said device (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 6:

Korobkov et al. further discloses wherein the M subcarrier signals are OFDM subcarrier signals and where the N subcarrier frequencies are evenly spaced frequencies (abstract, par 0017, lines 1-56).

Regarding claim 7:

Korobkov et al. further discloses wherein the fixed filter included on each of said M signal paths is positioned in series (54 in figure 6).

Korobkov et al. disclose all of the subject matter as described above except for specifically teaching with said corresponding power amplification circuit either before or after the corresponding power amplification circuit.

However, Cleveland et al., in the same field of endeavor, teaches with said corresponding power amplification circuit either before or after the corresponding power amplification circuit (250 in figure 2, col 3, lines 60-67, col 7, lines 1-5).

One of ordinary skill in the art would have clearly recognized that in a multi-carrier communication systems, spread spectrum multiple access typically employed with orthogonal frequency-division multiplexing (OFDM). Spreading codes are commonly used to spread data symbols across multiple OFDM subcarriers for diversity benefits and to shape the resulting superposition of coded subcarriers for reducing the Peak-to-Average Power (PAPR) of the transmitted signal. Often times, power amplifiers are used to amplify the transmitted signal power to a desired power threshold. To adjust the signal power to a desired threshold and output a combined signal for transmission, it would have been obvious to one ordinary skill in the art at the time the

invention was made to use power amplifiers as taught by Cleveland et al. in system and method of Korobkov et al. in order to provide a desired power level for transmission and reduce peak average power ratio in the system.

Regarding claim 8:

Korobkov et al. further discloses wherein the programmable signal generator (52(1)-52(J) in figure 3) included in each subcarrier signal path generates an analog subcarrier signal; and wherein and said filter circuit included in each subcarrier signal path are analog circuits (54 in figure 3, par 0040, lines 1-12).

Korobkov et al. disclose all of the subject matter as described above except for specifically teaching said power amplification circuit.

However, Cleveland et al., in the same field of endeavor, teaches said power amplification circuit (250 in figure 2, col 3, lines 60-67, col 7, lines 1-5).

One of ordinary skill in the art would have clearly recognized that in a multi-carrier communication systems, spread spectrum multiple access typically employed with orthogonal frequency-division multiplexing (OFDM). Spreading codes are commonly used to spread data symbols across multiple OFDM subcarriers for diversity benefits and to shape the resulting superposition of coded subcarriers for reducing the Peak-to-Average Power (PAPR) of the transmitted signal. Often times, power amplifiers are used to amplify the transmitted signal power to a desired power threshold. To adjust the signal power to a desired threshold and output a combined signal for transmission, it would have been obvious to one ordinary skill in the art at the time the invention was made to use power amplifiers as taught by Cleveland et al. in system and

method of Korobkov et al. in order to provide a desired power level for transmission and reduce peak average power ratio in the system.

Regarding claim 9:

Korobkov et al. further discloses wherein each of the M signal filter circuits, that each correspond to a different one of said M signal paths, is a programmable filter (figure 3 and 6).

Regarding claim 10:

Korobkov et al. further discloses wherein each of the M programmable filters has a passband corresponding to the subcarrier signal frequency of the subcarrier signal generated by the programmable signal generator circuit included on the same subcarrier signal path as the programmable filter (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 11:

Korobkov et al. further discloses wherein the programmable filters have a passband which has a bandwidth sufficient to pass said subcarrier signal but reject the nearest neighboring one, in frequency, of said N subcarrier signals (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 12:

Korobkov et al. further discloses

- wherein said device further transmits information using at least one additional preselected subcarrier frequency (figure 3 and 6) ,

the device further comprising:

- an additional subcarrier signal path including and fixed filter and filtering a subcarrier signal corresponding to said additional preselected subcarrier frequency (figure 6).

Korobkov et al. disclose all of the subject matter as described above except for specifically teaching an amplifier for amplifying.

However, Cleveland et al., in the same field of endeavor, teaches said power amplification circuit (250 in figure 2, col 3, lines 60-67, col 7, lines 1-5).

One of ordinary skill in the art would have clearly recognized that in a multi-carrier communication systems, spread spectrum multiple access typically employed with orthogonal frequency-division multiplexing (OFDM). Spreading codes are commonly used to spread data symbols across multiple OFDM subcarriers for diversity benefits and to shape the resulting superposition of coded subcarriers for reducing the Peak-to-Average Power (PAPR) of the transmitted signal. Often times, power amplifiers are used to amplify the transmitted signal power to a desired power threshold. To adjust the signal power to a desired threshold and output a combined signal for transmission, it would have been obvious to one ordinary skill in the art at the time the invention was made to use power amplifiers as taught by Cleveland et al. in system and method of Korobkov et al. in order to provide a desired power level for transmission and reduce peak average power ratio in the system.

Regarding claim 13:

Korobkov et al. further discloses where said additional subcarrier frequency corresponds to a control channel used to transmit control information (55 in figure 3, paragraph 0040, lines 1-22).

Regarding claim 24:

As shown in figure 1-8, Korobkov et al., discloses a frequency hopping (par 0096, lines 1-7) communications device for transmitting signals on a plurality of M subcarrier signals in parallel, each of said M subcarrier signals corresponding to a different one of M subcarrier signal frequencies, said M subcarrier signal frequencies being a subset of N subcarrier frequencies on which said communications device may transmit signals over time, where M and N are integers and where M<N (abstract, par 0017, lines 1-56), said frequency hopping communication device including:

- frequency control means (55 in figure 3) for controlling which of the N subcarrier frequencies are generated and used by said device for the transmission of signals (paragraph 0040, lines 1-22);
- a plurality of M separate subcarrier signals paths (figure 6) operating in parallel, each of the M subcarrier signal paths including a programmmable signal generator means (52(1)-52(J) in figure 3) for generating a corresponding one of the M subcarrier signals (figures 3 and 6) ***(in paragraph 0020, lines 4-10, Korobkov et al. disclose "<u>By way of explanation, a set of N complex values used to modulate the set of N sub-carriers for one sub-channel can be correctly positioned in the channel spectrum by placing the values in a sequence representing the complete set of sub-carriers for an entire channel and then taking an IFFT</u>". This clearly shows that the modulators of figure 3 generate OFDM sub-carriers. Also, see paragraphs 0006, 0017, 0018, 0020, 0037, 0038, and 0078)***, and filter means (54 in figure 3) for filtering the corresponding one of the M subcarrier signals (par 0040, lines 1-12), said programmable signal generator means generating a subcarrier signal determined by

said frequency control means (55 in figure 3) and having a subcarrier frequency corresponding to said subcarrier signal path to which said signal *generator* corresponds ***(in the abstract , lines 1-5, Korobkov et al. disclose "A transmitter and corresponding method for transmitting an OFDM signal in a communications channel, including a plurality of base-band OFDM modulators, each for modulating a respective data signal onto a plurality of orthogonal sub-carriers". Also, see paragraphs 0006, 0017, 0018, 0020, 0037, 0038, and 0078)*** (figure 3, par 0040, lines 1-12); and

- combining means (62 in figure 6) for combining corresponding to different subcarrier signal paths prior to transmission (par 0063, lines 1-19).

Korobkov et al. disclose all of the subject matter as described above except for specifically teaching power amplification means for amplifying the corresponding one of the M subcarrier signals.

However, Cleveland et al., in the same field of endeavor, teaches power amplification means for amplifying the corresponding one of the M subcarrier signals (250 in figure 2, col 3, lines 60-67, col 7, lines 1-5).

One of ordinary skill in the art would have clearly recognized that in a multi-carrier communication systems, spread spectrum multiple access typically employed with orthogonal frequency-division multiplexing (OFDM). Spreading codes are commonly used to spread data symbols across multiple OFDM subcarriers for diversity benefits and to shape the resulting superposition of coded subcarriers for reducing the Peak-to-Average Power (PAPR) of the transmitted signal. Often times, power amplifiers are used to amplify the transmitted signal power to a desired power threshold. To

adjust the signal power to a desired threshold and output a combined signal for transmission, it would have been obvious to one ordinary skill in the art at the time the invention was made to use power amplifiers as taught by Cleveland et al. in system and method of Korobkov et al. in order to provide a desired power level for transmission and reduce peak average power ratio in the system.

Korobkov et al. and Cleveland et al. disclose all of the subject matter as described above including a combiner for combining corresponding to different subcarrier signal paths prior to transmission as shows in figure 3 of Korobkov et al. below except for specifically teaching combining analog subcarrier signals.

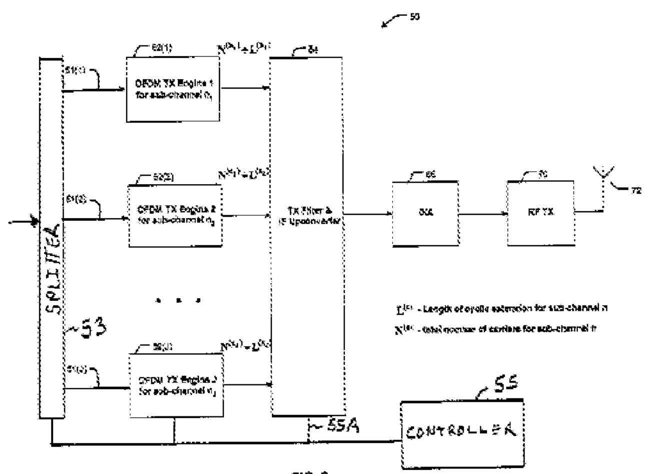
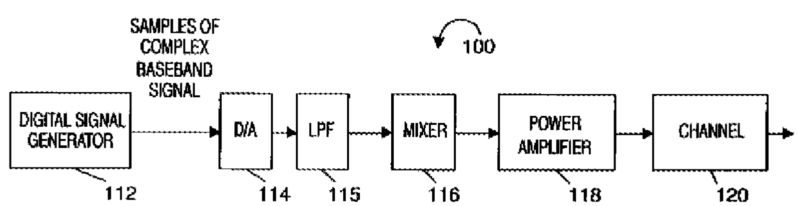


FIG. 3

However, AAPA in the same field of endeavor teaches analog subcarrier signals (114 in figure 1).



PRIOR ART

Fig. 1

In figure 3, Korobkov et al. shows that a D/A converter 68 is located after the TX filter 54. However AAPA shows that the D/A converter 114 can be located before the filter 116. Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system and method of Korobkov et al. by locating the D/A converter 68 of Korobkov et al. before the TX filter 54 as taught by AAPA in figure 1 in order to yield predictable results.

Regarding claim 25:

Korobkov et al. further discloses wherein each of the M signal filter means is a fixed filter, at least one of the M fixed filters having a passband bandwidth at least equal to Y times the average frequency spacing between the N frequencies that said device can use as the N subcarrier frequencies, where Y is a positive number greater than 1 (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 27:

Korobkov et al. further discloses wherein Y is at least as large as N (par 0006, lines 1-15, par 0041, lines 1-12, and par 0049, lines 1-11).

Regarding claim 28:

Korobkov et al. further discloses wherein each of said M signal filter means are identical fixed filters each having a passband bandwidth covering the full set of N subcarrier signal frequencies which may be used by said device (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

8. Claims 14, 16-18, and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korobkov et al. in view of Cleveland et al.

Regarding claim 14:

As shown in figure 1-8, Korobkov et al., discloses a frequency hopping (par 0096, lines 1-7) communication method for use in communication system wherein a device ca transmit information using M subcarrier signals at a time, each of the M subcarrier signals corresponding to a different subcarrier frequency, where M and N are positive integers and where M is less than N and where N is the total number of different subcarrier frequencies said device can use over time (abstract, par 0017, lines 1-56), said frequency hopping (par 0096, lines 1-7), the method comprising:

- i) operating M programmable signal generators (52(1)-52(J) in figure 3) to generate said M subcarrier signals (par 0017, lines 1-56);
- ii) separately processing each of the M subcarrier signals to produce M processed subcarrier signals ***(in paragraph 0020, lines 4-10, Korobkov et al. disclose "<u>By way of explanation, a set of N complex values used to modulate the set of N sub-carriers for one sub-channel can be correctly positioned in the channel spectrum by placing the values in a sequence representing the complete set of sub-carriers for an entire channel and then taking an IFFT</u>". This clearly shows that the modulators of figure 3 generate OFDM sub-carriers. Also, see paragraphs 0006, 0017, 0018, 0020, 0037, 0038, and 0078)***, the processing of each of said M subcarrier signals including a filtering operation ***(in the abstract , lines 1-5, Korobkov et al. disclose "<u>A transmitter and corresponding method for transmitting an OFDM signal in a communications</u>***

<u>channel, including a plurality of base-band OFDM modulators, each for modulating a respective data signal onto a plurality of orthogonal sub-carriers</u>". Also, see paragraphs 0006, 0017, 0018, 0020, 0037, 0038, and 0078), said separate processing thus including M separate filtering operations (54 in figure 3, par 0017, lines 1-56, par 0040, lines 1-12); and

- iii) combining (62 in figure 6) the M processed subcarrier signals to generate a frequency division multiplexed transmission signal (par 0063, lines 1-19);
- iv) controlling (55 in figure 3) at least one of said M programmable signal generators to change the frequency of the subcarrier signal generated by said at least one programmable signal generator (paragraph 0040, lines 1-22); and
- v) repeating steps (i), (ii), and (iii) (this limitation is obvious because steps I-iii can be repeated in the system).

Korobkov et al. disclose all of the subject matter as described above except for specifically teaching an amplification operation.

However, Cleveland et al., in the same field of endeavor, teaches an amplification operation (250 in figure 2, col 3, lines 60-67, col 7, lines 1-5).

One of ordinary skill in the art would have clearly recognized that in a multi-carrier communication systems, spread spectrum multiple access typically employed with orthogonal frequency-division multiplexing (OFDM). Spreading codes are commonly used to spread data symbols across multiple OFDM subcarriers for diversity benefits and to shape the resulting superposition of coded subcarriers for reducing the Peak-to-Average Power (PAPR) of the transmitted signal. Often times, power amplifiers

are used to amplify the transmitted signal power to a desired power threshold. To adjust the signal power to a desired threshold and output a combined signal for transmission, it would have been obvious to one ordinary skill in the art at the time the invention was made to use power amplifiers as taught by Cleveland et al. in system and method of Korobkov et al. in order to provide a desired power level for transmission and reduce peak average power ratio in the system.

Regarding claim 16:

Korobkov et al. further discloses wherein said M separate filtering operations are performed using M separate fixed filters (54 in figure 6), at least one of the M fixed filters having a bandwidth at least equal to Y times the average frequency spacing between the N frequencies that said device can use as the N subcarrier frequencies, where Y is a positive number greater than 1 (abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 17:

Korobkov et al. further discloses wherein Y > N divided by M (par 0003, lines 1-18, par 0037, lines 1-3, par 0038, lines 1-4).

Regarding claim 18:

Korobkov et al. further discloses wherein Y is equal to or greater than N (par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 21:

Korobkov et al. further discloses wherein said M separate filtering operations are performed using M separate programmable filters, the frequency of each of each of the

M programmable filters corresponding to the frequency of the subcarrier signal being filtered (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 22:

Korobkov et al. disclose all of the subject matter as described above except for specifically teaching changing the amount of power amplification performed on one of the M subcarrier signals when the frequency of said subcarrier signal is changed.

However, Cleveland et al., in the same field of endeavor, teaches changing the amount of power amplification performed on one of the M subcarrier signals when the frequency of said subcarrier signal is changed (250 in figure 2, col 3, lines 60-67, col 7, lines 1-5).

One of ordinary skill in the art would have clearly recognized that in a multi-carrier communication systems, spread spectrum multiple access typically employed with orthogonal frequency-division multiplexing (OFDM). Spreading codes are commonly used to spread data symbols across multiple OFDM subcarriers for diversity benefits and to shape the resulting superposition of coded subcarriers for reducing the Peak-to-Average Power (PAPR) of the transmitted signal. Often times, power amplifiers are used to amplify the transmitted signal power to a desired power threshold. To adjust the signal power to a desired threshold and output a combined signal for transmission, it would have been obvious to one ordinary skill in the art at the time the invention was made to use power amplifiers as taught by Cleveland et al. in system and

method of Korobkov et al. in order to provide a desired power level for transmission and reduce peak average power ratio in the system.

Regarding claim 23:

Korobkov et al. further discloses controlling (55 in figure 3) at least one of said M programmable signal generators to change the frequency of the subcarrier signal includes:

- operating said M programmable generators (52(1)-52(J) in figure 3) to switch from generating a first set of M subcarrier signals corresponding to a first set of M uniformly spaced subcarrier frequencies to generating a second set of M subcarrier signals corresponding to a second set of M uniformly spaced subcarrier frequencies(par 0017, lines 1-56, par 0040, lines 1-12),
- a first subcarrier frequency in said first set of M subcarrier frequencies being separated from a first subcarrier frequency in said second set of M subcarrier frequencies by a frequency spacing that is less than Y times the frequency spacing between subcarrier signals in said first and second sets of M subcarrier signals (abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

9. Claims 15 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Korobkov et al. in view of Cleveland et al. and further in view of Applicant's Admitted Prior Art (AAPA) (figure 1, specification, pages 2-3).

Regarding claim 15:

Korobkov et al. and Cleveland et al. disclose all of the subject matter as described above except for specifically teaching wherein said M subcarrier signals are analog signals and wherein said filtering operation is an analog filtering operation.

However, AAPA in the same field of endeavor teaches wherein said M subcarrier signals are analog signals and wherein said filtering operation is an analog filtering operation (114 in figure 1, specification, pages 2-3).

In figure 3, Korobkov et al. shows that a D/A converter 68 is located after the TX filter 54. However AAPA shows that the D/A converter 114 can be located before the filter 116. Therefore, it would have been obvious to one of ordinary skilled in the art at the time the invention was made to modify the system and method of Korobkov et al. by locating the D/A converter 68 of Korobkov et al. before the TX filter 54 as taught by AAPA in figure 1 in order to yield predictable results.

Regarding claim 19:

Korobkov et al. further discloses wherein said M separate filtering operations are performed using identical fixed filters each having a bandwidth covering the full set of N subcarrier signal frequencies which may be used by said device (figure 6, abstract, par 0006, lines 1-15, par 0041, lines 1-12, par 0049, lines 1-11).

Regarding claim 20:

Korobkov et al. further discloses wherein the N subcarrier signals are OFDM subcarrier signals (abstract, par 0017, lines 1-56).

10. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Korobkov et al. in view of Cleveland et al., and further in view of Langberg et al. (US 5,852,630).

Regarding claim 29:

Korobkov et al. and Cleveland et al., disclose all of the subject matter as described above in claim 14 except for the method written by a software program embodied in a computer-readable medium.

However, Langberg et al. teaches that the method and apparatus for a transceiver warm start activation procedure with precoding can be implemented in software stored in a computer-readable medium. The computer-readable medium is an electronic, magnetic, optical, or other physical device or means that can be contain or store a computer program for use by or in connection with a computer-related system or method (column 3, lines 51-65). One skilled in the art would have clearly recognized that the method of Korobkov et al. would have been implemented in software. The implemented software would perform same function of the hardware for less expense, adaptability, and flexibility. Therefore, it would have been obvious to one ordinary skilled in the art at the time of the invention was made to use the software as taught by Langberg et al. in system and method of Korobkov et al. in order to reduce cost and improve the adaptability and flexibility of the communication system.

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kabir A. Timory whose telephone number is 571-270-1674. The examiner can normally be reached on 6:30 AM - 3:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shuwang Liu can be reached on 571-272-3036. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/Kabir A Timory/

Examiner, Art Unit 2611

/Shuwang Liu/

Supervisory Patent Examiner, Art Unit 2611